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LETTERS TO THE EDITOR

Ischemia at a Distance

Apart from the hypotheses discussed by Brymer et al. (1) and the accompanying editorial (2), there is yet another mechanism of the interesting phenomenon of ischemia at a distance, illustrated in the following case.

Case report. A 53 year old man was admitted to the coronary care unit with prolonged chest pain and ST-T wave abnormalities seen in the precordial leads only. The pain responded to sublingual nitroglycerin and morphine. Approximately 5 hours later, chest pain recurred, and ST segment elevation was now observed in the precordial leads and leads III and aVF (Fig. 1A). Conventional measures failed to control the pain, and intravenous nitroglycerin drip infusion was initiated. Serum enzyme elevation was characteristic of a myocardial infarction and returned to normal in 3 days. The day after cessation of nitroglycerin infusion, there was recurrence of chest pain with new elevation of ST segments in the precordial and inferior leads (Fig. 1B). Nitroglycerin drip infusion was again initiated and further enzyme rise consistent with extension of infarction occurred. Treatment with calcium channel blockers was initiated before the nitroglycerin infusion was discontinued. Coronary arteriography for atypical chest pain 8 years earlier had revealed normal findings. Because review of the arteriograms revealed that the left anterior descending artery was rather small, not extending beyond the cardiac apex, the presence of multivessel coronary artery disease was suspected. Coronary arteriography performed 1 week after the recent infarction revealed total occlusion of the left anterior descending artery after the diagonal branch (Fig. 2). The circumflex and right coronary arteries were normal. Left ventriculography revealed anteroapical scar.

In this patient, occlusion of the left anterior descending artery alone caused a myocardial injury pattern in both the anterior and inferior electrocardiographic leads. The probable explanation is reflex spasm of "resistance" vessels in the right coronary artery distribution, triggered by myocardial injury in the distribution of the left anterior descending artery (3). This, therefore, constitutes another cause of "ischemia at a distance."

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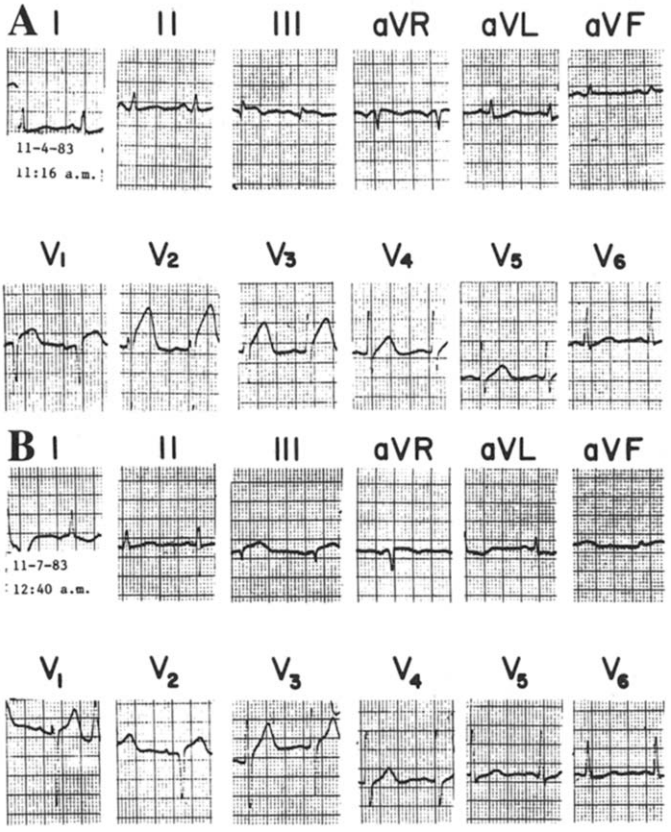

Figure 1. Electrocardiograms. **A,** On the day of admission showing ST elevations in the right precordial leads, III and aVF; **B,** 3 days later, during recurrence of chest pain. ST elevations are now more marked in leads III and aVF than in the precordial leads.

Reply

This case may well represent several episodes of coronary artery spasm. The sample electrocardiograms in Figures 1A and B show ST segment changes that are different from those of most of the records we obtained during angioplasty and reported in our study. Singh's tracings, both on the initial day of observation and several days later, show ST segment elevation, suggesting *transmural* myocardial ischemia in *both* the primary zone anterior leads (V_1 to V_3) and in the remote inferior leads (III and aVF). Our findings were, with a single exception, ST elevation in primary zone leads and ST depression, suggesting only subendocardial ischemia, in remote leads.

The coronary arteriogram obtained after the events Singh describes shows a "preponderant" right coronary artery with a very large posterior descending branch and a nearly flush cutoff occlusion of the left anterior descending artery. Although results of coronary arteriography were reported to be normal 8 years pre-